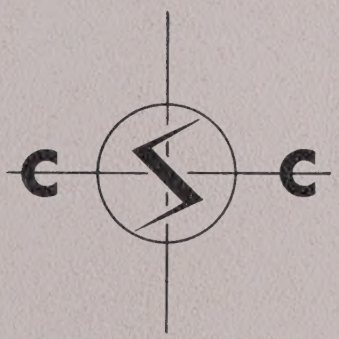
INSTRUCTION MANUAL

FOR

RTD PYROMETER
WITH OVER-TEMPERATURE PROTECTOR

A. 644
SYL-722



ELECTRONIC INSTRUMENTATION FOR INDUSTRY

CALIBRATION STANDARDS CORPORATION *a subsidiary of* ROYAL INDUSTRIES, INC.

CHG	E.O.NO.	DATES	BY	CHK
A	RELEASE	5/5/83		
B	3836	8/17/83		

MODEL C09B-5-1/C09B-5-2
RTD PYROMETER
WITH OVER-TEMPERATURE PROTECTOR

07743ML-01

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1.0 GENERAL INFORMATION

1.1 UNPACKING AND INSPECTION

Your Model CO9B-5-1/CO9B-5-2 was systematically inspected and tested, then carefully packed before shipment. Unpack the instrument and inspect for obvious shipping damage. Notify the freight carrier immediately upon discovery of any damage.

1.2 FUNCTIONAL DESCRIPTION

The Model CO9B-5-1/CO9B-5-2 is designed for a wide range of precise temperature monitoring, control, and over temperature protection. Applications include furnaces, ovens and environmental chambers and industrial process systems. The Model CO9B-5-1/CO9B-5-2 will measure the output of 2-wire 100 ohm platinum RTD sensors. Calibration is to the DIN 43760 Standard (based on ITPS-68) with a temperature coefficient of 0.00385 ohm/ohm/^{o}C. An open sensor is indicated when the last three digits blank.

The Model CO9B-5-1/CO9B-5-2 is available with 1^{o} resolution. Range changes are easily accomplished so that temperature may be displayed in either the Fahrenheit or Celsius scale by switch selection on the Signal conditioner and upper control card.

High accuracy, repeatability and reliability are obtained by the use of VLSI circuitry and POLYLOG II linearizer.

1.3 SPECIFICATIONS

1.3.1 Temperature Sensor

Type	Resistance Temperature Detector, RTD
Material	Platinum
Resistance	100 ohms @ 0^{o}C
Calibration	DIN 43760 based on IPTS-68
Temperature Coefficient (Alpha)	0.00385ohm/Ohm/^{o}C
Connection Standard	2-wire configuration
Lead Resistance Maximum:	
2-wire configuration	10 ohms (sum of both lead resistances)

1.3.2 Pyrometer Indicator

Input

Configuration	Differential
Polarity	Bipolar with polarity indication
Zero	Adjustable ±10° via a potentiometer accessible from the front panel.
Overvoltage Protection	50 V p
Sensor Break Detection	Most significant digit displays "1" while 3-least significant digits blanked.
Sensor Excitation, Maximum	2 mA Nominal
Normal Mode Rejection NMR @ 50/60 Hz	60 dB
Common Mode Rejection from dc to 60 Hz	120 dB from ac power to signal low
Common Mode Voltage from dc to 60 Hz	500 V p
Linearization	POLYLOG II
Temperature Range	-330°F to +1470°F or -200°C to +800°C selected by slide switch inside the indicator

Accuracy @ 25°C (exclusive of sensor)

MODEL	RANGE	OVERALL ERROR ±1/2 LSD	RESOLUTION
C09B-5-1 °C	-129 to +760°C	1.3°C	1.0°C
C09B-5-2 °F	-200 to +1400°F	2.3°F	1.0°F

Zero Tempco	0.02 deg/deg
Span Tempco	0.006%R/°C
Sensor Lead Resistance Effect	Add 0.015%R for °C or 0.03% for °F per ohm of conductor resistance to overall accuracy when calibrated with 10 feet of #22 gauge leads.
Warm-up to Rated Accuracy	Less than 1 minute

1.3.3 General

Operating Temperature	0°C to +50°C
Storage Temperature	-40°C to +75°C
Humidity	Up to 95% RH at less than +50°C
Weight	600 g or 1.4 lb.
Case (Panel Mount)	
Material	Thermoplastic per UL 94-V-1
Bezel (W x H x T)	96 x 48 x 6 mm or (3.78 x 1.89 x 0.24 in.)
Depth Behind Bezel w/Conn	135.4 mm or (5.33 in).
Panel Cutout (W x H)	92 x 45 mm or (3.62 x 1.77 in).
Lens	Blue M Dwg. No. A-4474-Q DEG. C Blue M Dwg. No. A-4475-Q DEG. F

1.3.4 Conversion

Technique	Dual slope, average value, autozero
Signal Integration Period	100 ms nominal
Reading Rate	2.5/sec nominal
Full Scale Step Response	1.0 sec

1.3.5 Display

Type	7-segment, LED, orange 14.2 mm high (0.56 in.)
Lens	Red lexan MVCL 14416
Symbols	-1.8.8.8
Polarity Sign	Minus only
Over Range	3 least-significant digits blanked while most significant digit remains lighted.

1.3.6 Digital Input

Logical "0"	0 V dc or open circuit
Logical "1"	+5 V dc ±5%
Test Display	"1" = display of -1888

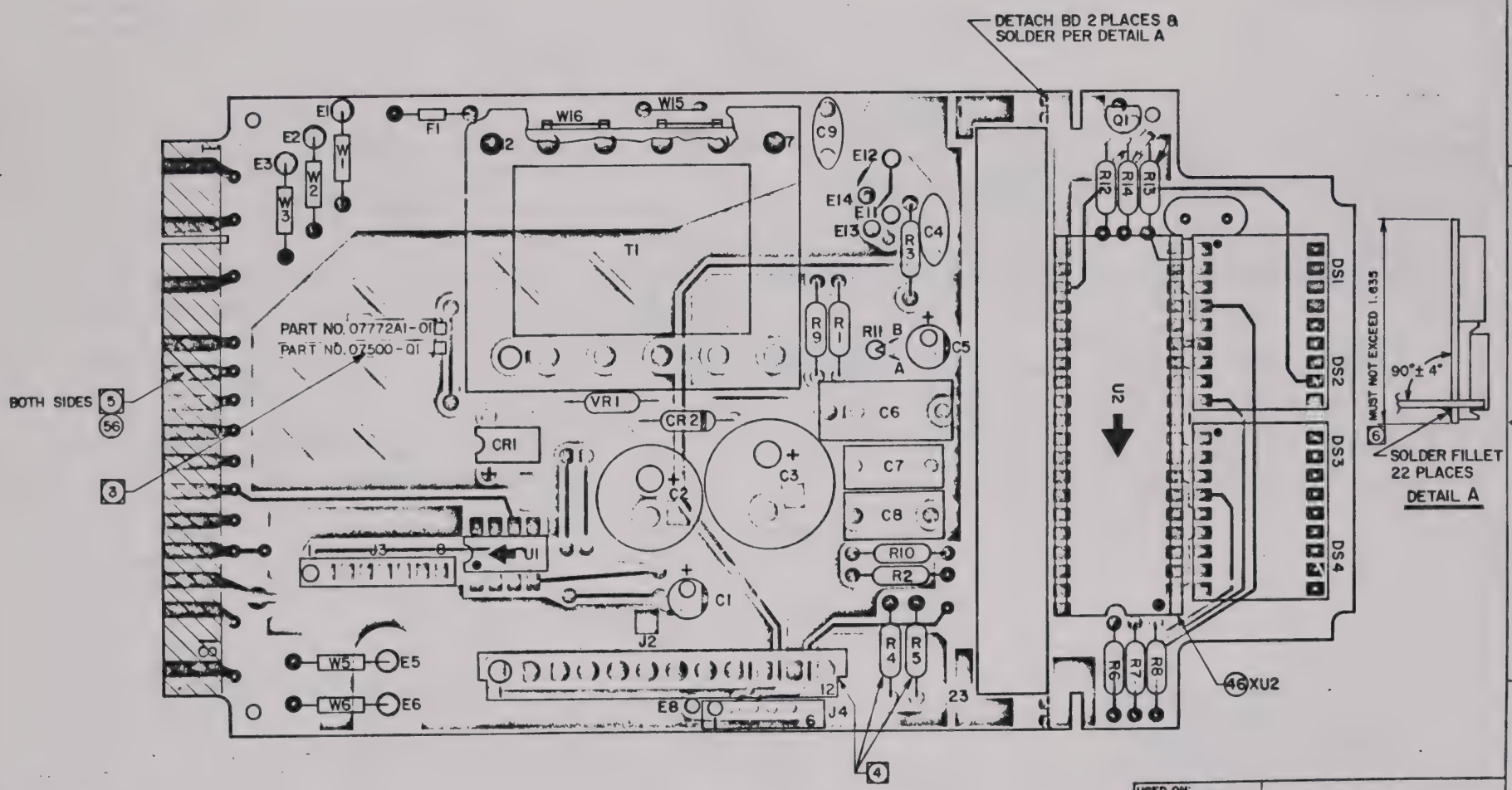
1.3.7 Power

Standard Input Voltage	115 V ac ±10%, 50/60 Hz
Optional Input Voltages	100 or 230 V ac ±10%, 50/60 Hz
Frequency Range	47 to 63 Hz
Consumption	3 W maximum
Output Voltage	+5 V dc ±5% @ 5 mA maximum

1.4 CONNECTOR PINOUTS AND DECIMAL POINT WIRING: J1

(Left to right while looking at the rear of the case)

A = AC Power HI
B = Not Used
C = AC Power LO
D = Not Used
E = AC Power GND
F = Not Used
H = 199.9 Decimal Point
J = 19.99 Decimal Point
K = 1.999 Decimal Point
L = Test
M = 5 V
N = Not Used
P = Reference Input HI
R = Reference Input LO
S = Analog Ground
T = Signal LO Input
U = Not Used
V = Signal HI Input



ONS	E.O. NO.	DATED	BY	CHK
A	REL	5/5/83	PB	

1. CUT BOARD TO DIMENSION SHOWN . MAY BE FILED AS NEEDED TO MAIN DIMENSION .
2. APPLY LUBRICANT (ITEM 56) TO EDGE CONNECTOR FINGERS .
3. MOUNT FLUSH WITH BOARD .
4. PERMANENTLY MARK APPROPRIATE 07772A1-01 BOX .

2 . REF PARTS LIST 07772A1-XX ; SCHEMATIC 07772SC-XX .
1 . ASSEMBLE PER WORKMANSHIP MANUAL 02281-01 .
NOTES : UNLESS OTHERWISE SPECIFIED

C	-◐-	-◐-	-●-
B	-◐-	-●-	-◐-
A	-●-	-◐-	-◐-
SLDR SW	DP1	DP2	DP3

DECIMAL POINT OPTION

E	-●-	-◐-	-◐-
D	-●-	-●-	-◐-
SLDR SW	200MV	400MV	2V

INTEGRATOR RANGE CHART

USED ON: 8501

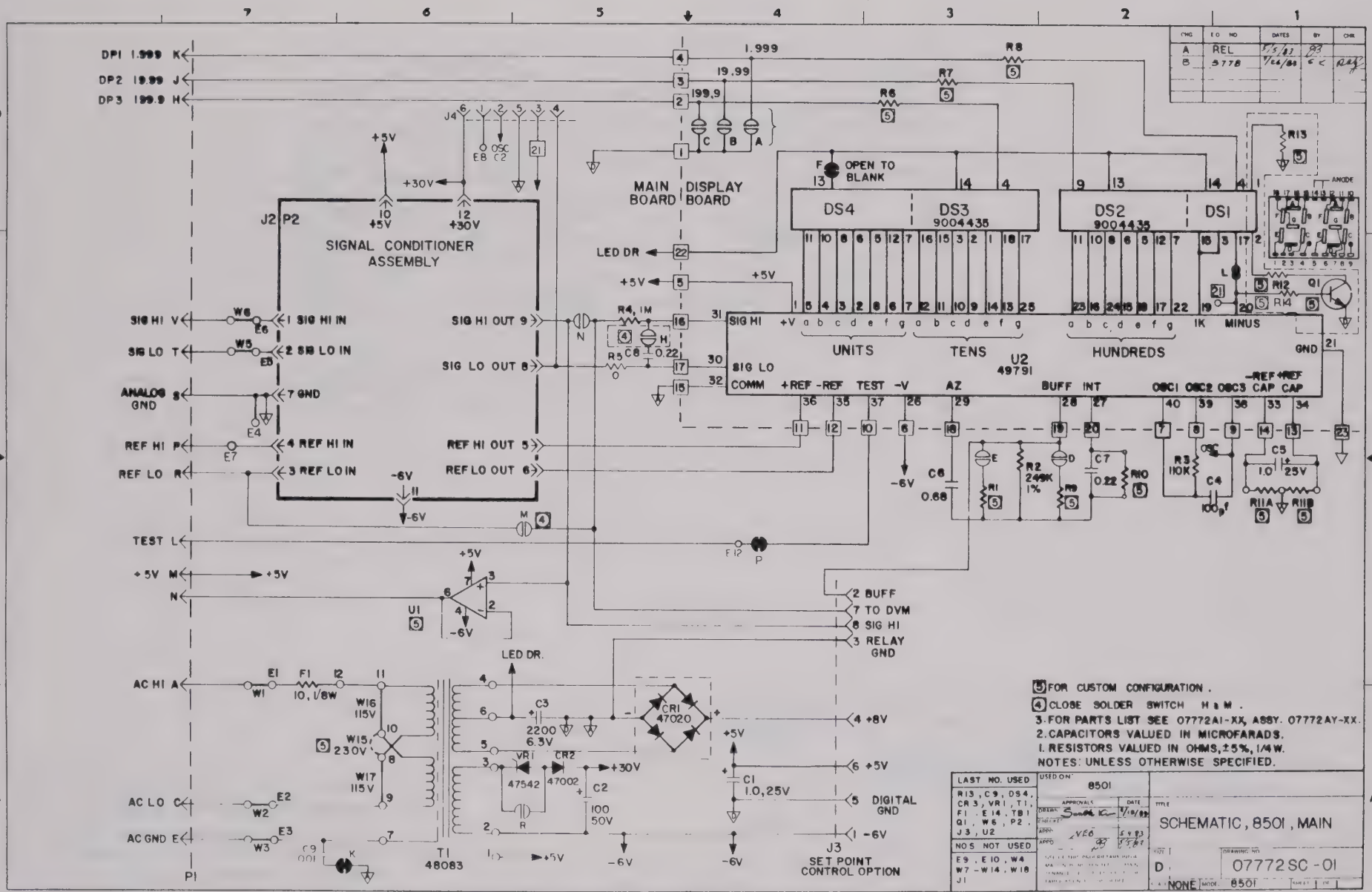
APPROVALS	DATE
DRAWN	5/5/83
CHECKED	5/6/83
APPD	5/6/83
APPD	5/7/83

USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO MAINTENANCE OF OUR PRODUCTS OR FABRICATION TO OUR ORDER

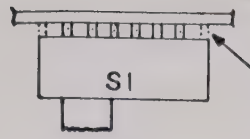
TITLE: PCB ASSY DWG, 8501 , MAIN

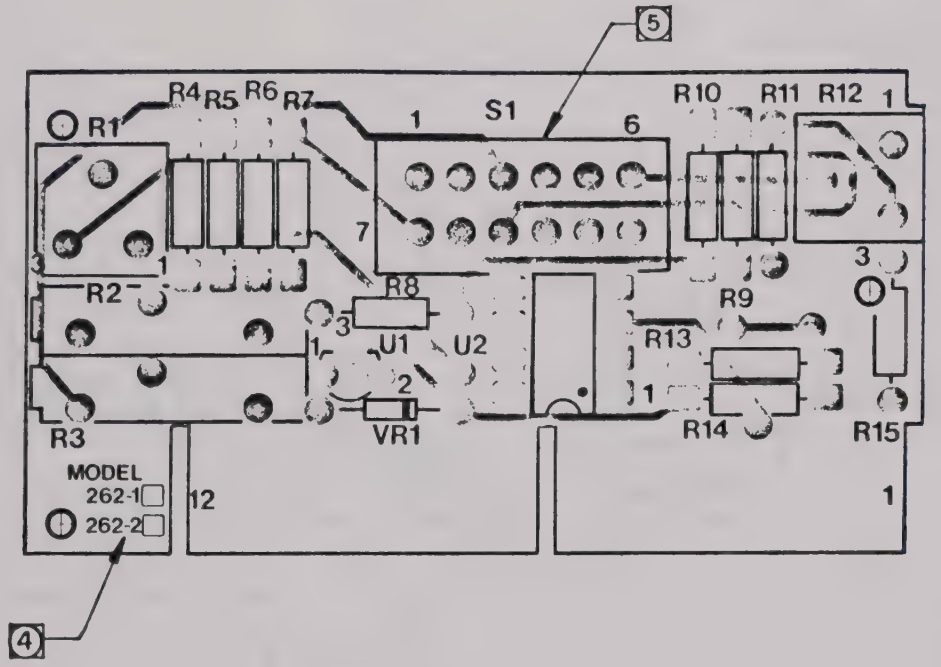
SIZE	CODE IDENT NO	DRAWING NO
D	32873	07772AY-01

SCALE 4:1 MODEL 8501 SHEET 1 OF 1


DP1 1.999 K
DP2 19.99 J
DP3 199.9 H
1.999
19.99
199.9
MAIN BOARD
DISPLAY BOARD
SIGNAL CONDITIONER ASSEMBLY
+5V
+30V
-6V
SIG HI V
SIG LO T
ANALOG GND S
REF HI P
REF LO R
TEST L
+5V M
N
AC HI A
AC LO C
AC GND E
SIG HI OUT 9
SIG LO OUT 8
REF HI OUT 5
REF LO OUT 6
LED DR
OPEN TO BLANK
DS4
DS3
DS2
DS1
9004435
UNITS
TENS
HUNDREDS
1K
MINUS
U2
49791
SIG HI
SIG LO
COMM
+REF
-REF
TEST
-V
AZ
BUFF
INT
OSC1
OSC2
OSC3
-REF CAP
+REF CAP
GND
2 BUFF
7 TO DVM
8 SIG HI
3 RELAY GND
LED DR.
CR1 47020
+8V
+5V
DIGITAL GND
-6V
J3
SET POINT CONTROL OPTION
T1 48083
P1
5 FOR CUSTOM CONFIGURATION.
4 CLOSE SOLDER SWITCH H & M.
3. FOR PARTS LIST SEE 07772A1-XX, ASSY. 07772AY-XX.
2. CAPACITORS VALUED IN MICROFARADS.
1. RESISTORS VALUED IN OHMS, ±5%, 1/4W.
NOTES: UNLESS OTHERWISE SPECIFIED.
LAST NO. USED
R13, C9, DS4, CR3, VR1, T1, F1, E14, TB1, Q1, W6, P2, J3, U2
NOS NOT USED
E9, E10, W4, W7-W14, W18, J1
USED ON
8501
SCHEMATIC, 8501, MAIN
07772SC-01
D
NONE
8501

CHG	E.O. NO.		BY	CHK
A	REL	5/3/83	93	





5 MOUNT FLUSH WITH PCB .
4 PERMANENTLY MARK 262-1 BOX .
3. FOR SCHEMATIC SEE 07773SC-XX .
2. FOR PARTS LIST SEE 07773AI-XX.
1. ASSEMBLE PER WORKMANSHIP MANUAL 02281-01 .
NOTES : UNLESS OTHERWISE SPECIFIED

UNLESS SPECIFIED DIM TOLERANCES ARE	USED ON: 8501	
MILLIMETERS: .X = ± .5 .XX = ± .25	APPROVALS	DATE
INCHES: .XX = ± .02 .XXX = ± .010	DRAWN Sunde Kim	5/15/83
ANGLES: ± 0° 30'	CHECKED [illegible]	5/18/83
DO NOT SCALE PRINT	APPD NEB	5-4-83
	APPD 93	5/3/83

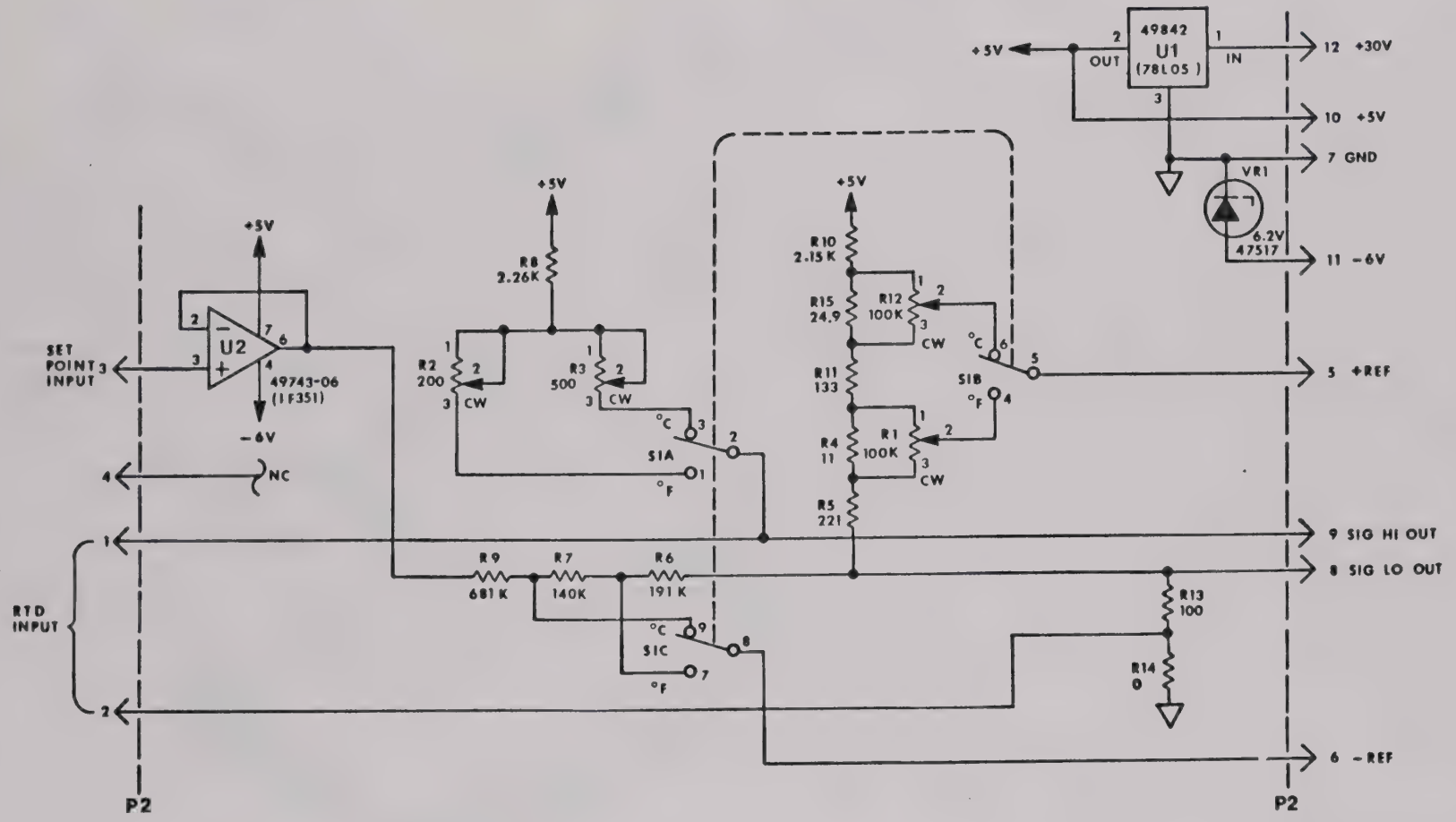
USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO MAINTENANCE OF OUR PRODUCTS OR FABRICATION TO OUR ORDER.

TITLE: PCB ASSY DWG , 8501, SIGNAL CONDITIONER

SIZE	CODE IDENT NO	DRAWING NO
C	32873	07773AY-01

SCALE 4/1 | MODEL 8501 | SHEET 1 OF 1

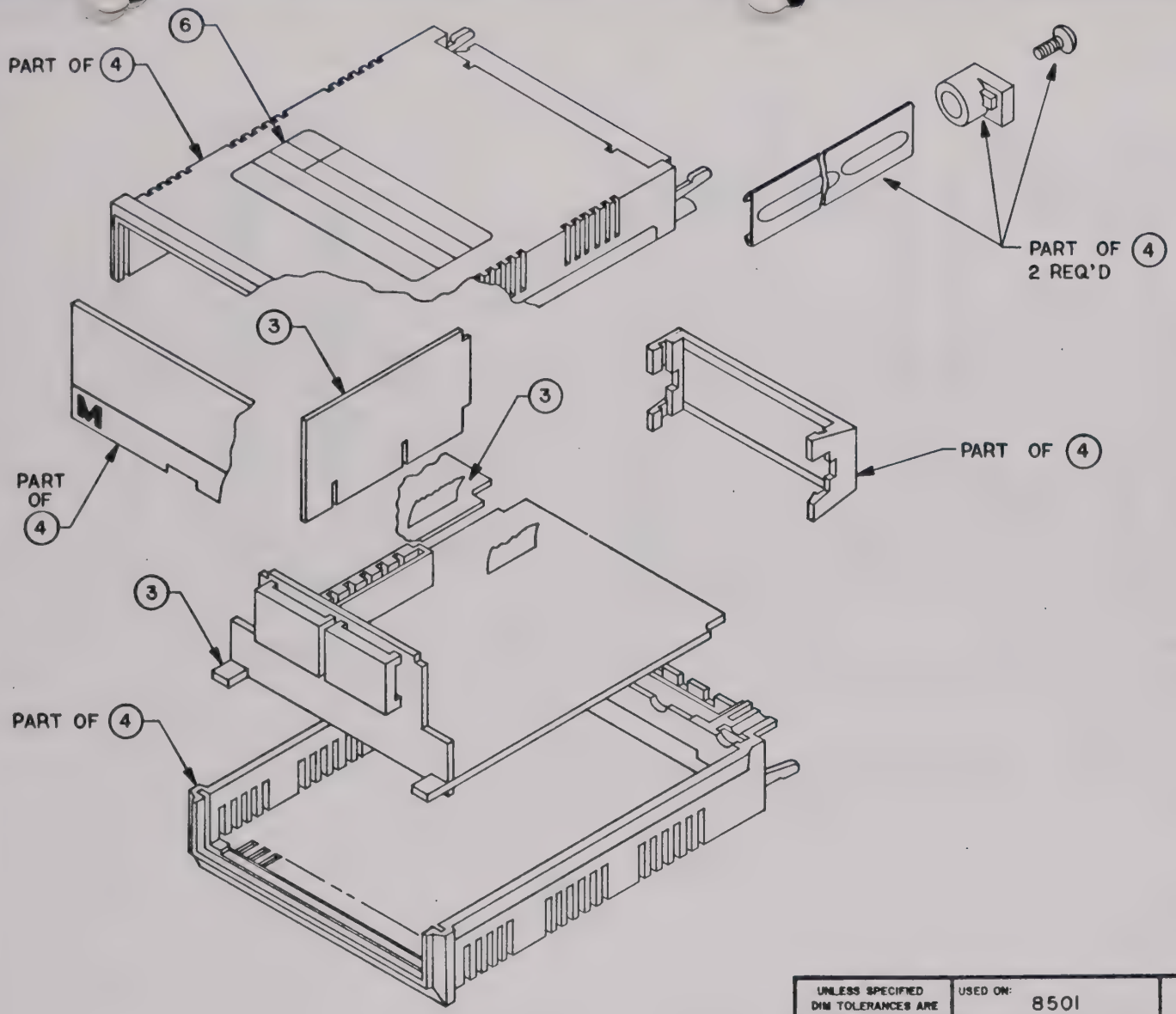
CHG	E.O. NO.	DATES		CHK
A	RELEASE	5/3/83		



3. REF: ASSEMBLY NO 07773AY-XX; P/L NO. 07773AI-XX.
2. ALL CAPACITORS VALUED IN MICROFARADS.
1. ALL RESISTORS VALUED IN OHMS ±1%, 1/8W.
NOTE: UNLESS OTHERWISE SPECIFIED

LAST NO'S USED	USED ON 8501		
R15.W5.U2.VR1.S1	APPROVALS	DATE	TITLE: SCHEMATIC, 8501, SIGNAL CONDITIONER
	DRAWN Sunde Kim	4/15/83	
	CHECKED [illegible]	4/28/83	
	APPD [illegible]	5-4-83	
	APPD [illegible]	5/3/83	
NO'S NOT USED	USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO MAINTENANCE OF OUR PRODUCTS OR FABRICATION TO OUR ORDER		SIZE C · CODE IDENT NO 32873 · DRAWING NO 07773SC-01 · SCALE NONE · MODEL 8501 · SHEET 1 OF 1

CHG	E.O. NO.	DAT	BY	CHK
A	REL	5/5/83		



1. REF P/L 07746A1 - XX.

NOTES : UNLESS OTHERWISE SPECIFIED

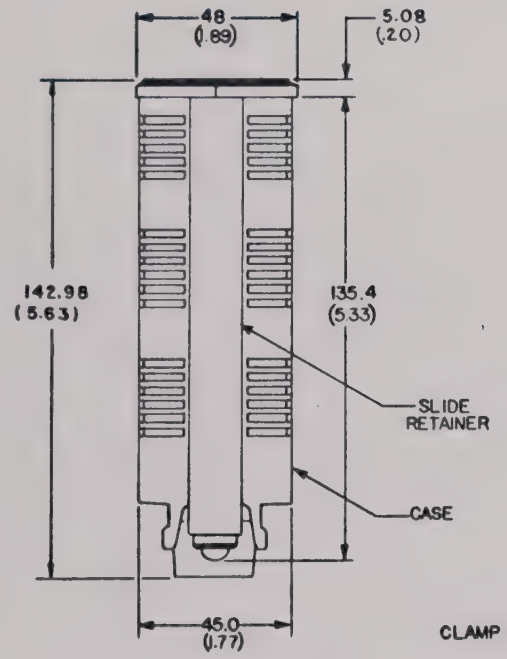
UNLESS SPECIFIED DIM TOLERANCES ARE	USED ON: 8501		
MILLIMETERS: .X = ± .5 .XX = ± .25	APPROVALS	DATE	TITLE: ASSEMBLY DWG/TOP, 8501, RTD PYROMETER AND OPT
INCHES: .XX = ± .02 .XXX = ± .010	DRAWN Sandra Kim	2/16/83	
ANGLES: ± 0° 30'	CHECKED [illegible]	4/20/83	
DO NOT SCALE PRINT	APPD VEB	5-4-83	SIZE: C; CODE IDENT NO.: 32873; DRAWING NO.: 07746AY-01
	APPD 93	5/5/83	SCALE: NONE; MODEL: 8501; SHEET 1 OF 1

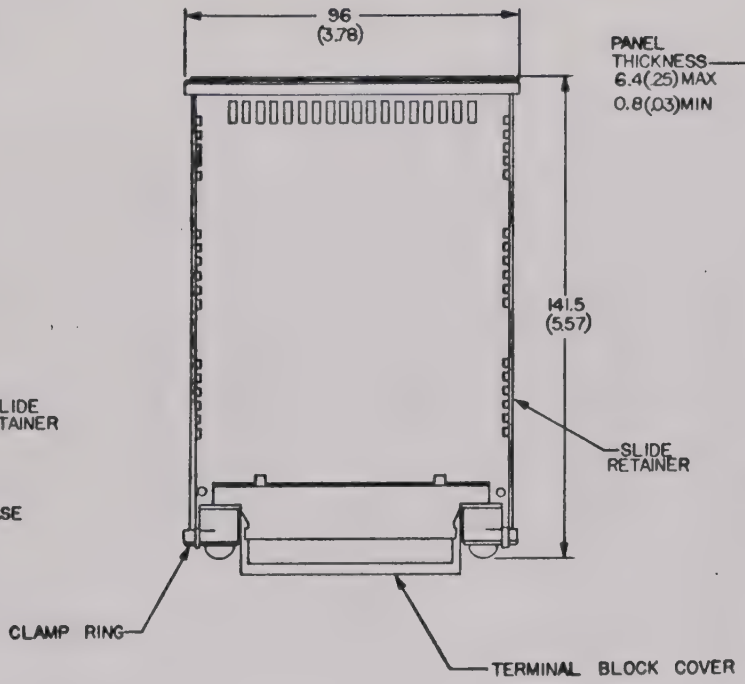
USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO MAINTENANCE OF OUR PRODUCTS OR FABRICATION TO OUR ORDER.

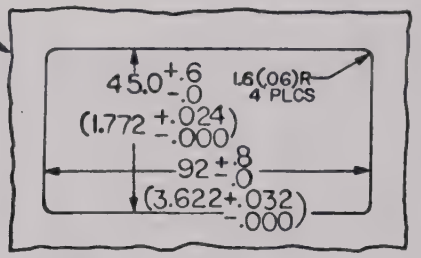
USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO TENANCE OF OUR PRICE FABRICATION TO OUR OBL

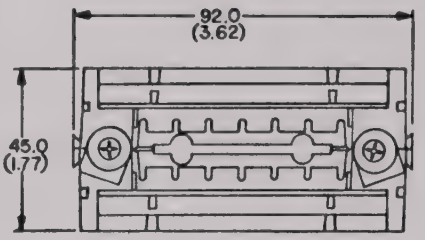
CHG	E.O. NO.	D	BY	CHK
A	RELEASE	11-	LC	
B	2207	8-29-79	AR	
C	NONE	3-4-80		
D	2694	1-28-81		

D1 - INCORPORATED E.C.O. 2694 - 7/20/81









REAR VIEW
(TERMINAL BLOCK COVER AND BEZEL NOT SHOWN FOR CLARITY)
CLAMP RINGS ROTATED AND SLIDE RETAINERS REMOVED AS SHOWN FOR INSTALLATION.

NOTES: DIMENSIONS IN MILLIMETERS ±.25 MM
AND IN (INCHES) ±.01 IN.

UNLESS SPECIFIED DIM TOLERANCES ARE		
	MM	IN
X	1.3	—
X	5	1
XX	.76	.02
XXX	—	.010

ANGLES ± 0° 30'
DO NOT SCALE PRINT
MATERIAL
FINISH

	BY	DATE
DR		11/10/77
CHK		11/14/77
APPD		11/14/77
APPD		

TITLE OUTLINE & MOUNTING FOR DIN IA CASE

SIZE	CODE IDENT NO.	NO.
C	32873	06896

SCALE 1/1 | MODEL DIN IA | SHEET 1 OF 1

2.0 MECHANICAL INSTALLATION INSTRUCTIONS

Insure that the panel cutout dimensions are as shown in Outline and Mounting Drawing 06896.

Procedure:

A) Loosen two #8 Phillips-head screws on rear of case enough to rotate the two clamp rings and to allow for the panel thickness.

B) Slide the two side rails towards the rear of the unit and remove them.

C) Insert the unit rear first into the panel cutout and slide the side rails back onto the case.

D) Rotate the clamp rings back into their original position and tighten enough to hold the case sufficiently in place. DO NOT OVERTIGHTEN!

2.1 EDGE CONNECTOR

The printed-circuit-board edge connector is easily installed by pushing it on to the printed-circuit board until it snaps under the two molded plastic tabs.

The printed-circuit-board edge connector is easily removed by pushing the two molded plastic tabs away from the connector body while pulling the connector off the printed-circuit board.

3.0 OPERATING INSTRUCTIONS

3.1 AC POWER WIRING

The Model C09B-5-1/C09B-5-2 is wired standard for operation on 115 V ac ±10%. The C1 option provides for operation on 230 V ac ±10%. With great care, connect power wires. (See Figure 2).

3.1.1 Standard Connection

J1-A	AC Power HI
J1-C	AC Power LO
J1-E	AC Power GND

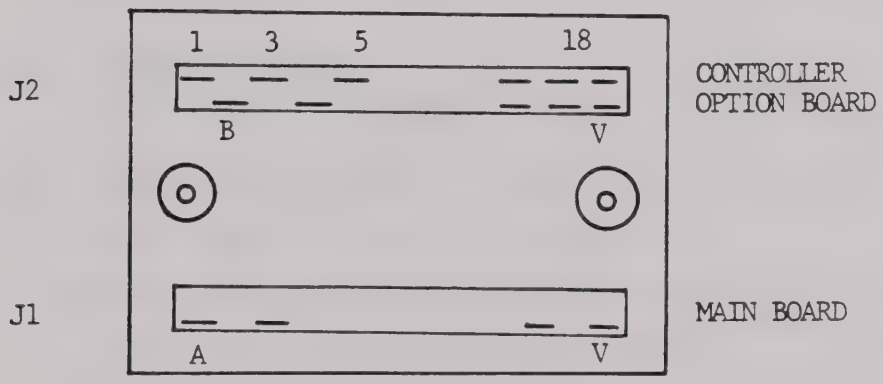
3.2 RTD SENSOR INPUT WIRING

3.2.1 Standard Connection (see Figure 1, J1)

J1-Pin	Signal	2-Wire
V	(+) Input	RL_1
		RTD
T	(-) Input	
		R_x
S	(1) Input	RL_2

NOTE: For 2-Wire $R_x = RL_1 + RL_2$

Figure 1



Rear View of Unit
Figure 2

3.3 INITIAL CHECKOUT

3.3.1 ^{o}C or ^{o}F Selection

The Model CO9B-5-1/CO9B-5-2 is shipped with the $^{o}C/^{o}F$ selector switch in the position selected by the customer lens selection, LC for ^{o}C or LF for ^{o}F.

To change the scale from ^{o}C to ^{o}F or ^{o}F to ^{o}C, remove ac power from the unit and proceed as follows:

A) Remove two #8 Phillips-head screws on the rear of case.

B) Remove two plastic clamp rings and two metal side rails.

C) Lift off the top half of case.

D) Slide the switch on the vertical plug-in card forward toward the display for ^{o}F scale and toward the rear connector for ^{o}C.

E) On the OTP Assembly place the latching pushbutton in for ^{o}C range and out for ^{o}F range.

F) If available, replace lens with one screened with the proper temperature scale designation and reassemble in the reverse order above.

3.3.2 Initial Checkout Procedure

CAUTION

Meters are internally connected for either 115 V ac or 230 V ac power. Check label on meter for proper supply voltage.

A) Connect ac power as indicated in Section 3.1.

B) Connect a 100 ohm resistor .1% or 1% between J1-V and J1-T.

C) Connect a piece of wire between J1-T and J1-S.

D) Apply power and examine the display. The readout should show approximately $000^{o}C$ or $032^{o}F$.

NOTE: For a more detailed check see Section 4.

3.3.3 Display Test

Connecting TEST (J1-L) to ±5 V(J1-M) lights all the display segments.

3.3.4 +5 V dc Output

+5 V dc @ 5 mA available at J1-M for use on test function.

4.0 CALIBRATION

4.1 CALIBRATION PROCEDURE

The Model C09B-5-1/C09B-5-2 was calibrated at the factory with a precision source. Frequent calibration is not necessary due to the stability and internal accuracy of the meter. The only adjustments normally available to the customer are the zero adjustments which are accessible with the lens removed.

4.1.1 Zeroing RTD Sensor

A) Remove the lens from the front by inserting a screwdriver under the notch at the bottom of the lens and prying the lens free.

B) Connect ac power and RTD Sensor per section 3.1 and 3.2.

C) Apply power and allow meter to warm up for two minutes.

D) Place the RTD Sensor in an ice point cell or stir in an ice bath until a stable reading is obtained.

E) Adjust appropriate potentiometer through the bottom left side of the display board. For ^{o}F meters adjust R2 upper potentiometer for a reading of $32^{o}F$ ($32.0^{o}F$). For ^{o}C meters adjust R3 lower potentiometer for a reading of $000^{o}C$ ($00.0^{o}C$).

4.1.2 Factory Calibration

A) See section 3.1 and 3.2 for ac power and RTD input wiring.

B) Connect calibrated resistance source in place of RTD sensor.

C) Remove top half of case per section 3.3.1.

D) Apply power and allow meter to warm up for two minutes.

E) Calibrate plug-in card as follows: (see Signal Conditioner Assembly).

Model	Range	Input (ohms)	Adjust	Reading
C09B-5-1	°C	100.00	R3	±000
C09B-5-1	°C	375.61	R12	800
C09B-5-2	°F	93.01	R2	±000
C09B-5-2	°F	371.96	R1	1450

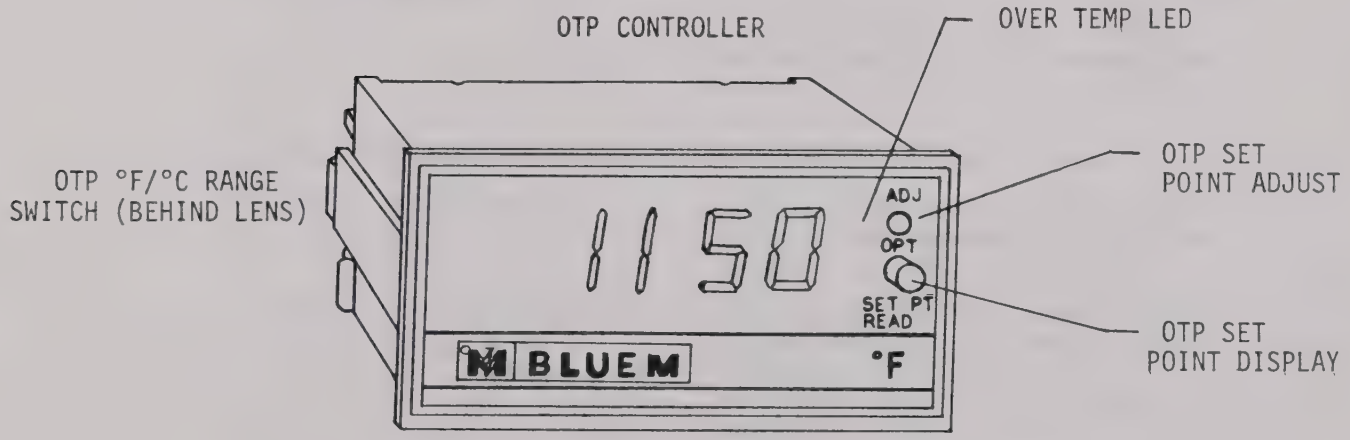
NOTE: Model C09B-5-1/C09B-5-2 requires main board integrator range of 2 V.

5.0 SET POINT CONTROLLER

5.1 OVER TEMPERATURE PROTECTOR (OTP)

5.1.1 Functional Description

This delineates the requirements and operating characteristics of a digital electronic pyrometer and over-temperature-protection circuit. The pyrometer receives a signal from a 100 platinum RTD which senses the temperature inside a chamber and indicates the chamber's temperature from -330°F to +1470°F or -200°C to +800°C on a display composed of four 0.56" high orange LED digits with a red lens. The over-temperature protector, OTP, works in parallel with the pyrometer indicator. An internal potentiometer and pushbutton switch, both accessible from the pyrometer's front panel, are used to adjust the over temperature set point in the operating ranges of -330°F to +425°F or -200°C or +218°C, -330°F to +700°F or -200°C to +371°C, -330°F to +1400°F or -200°C to +760°C (upper set point range is selected by Blue M with a switch closure to ground at the OTP printed circuit board edge connector). When the set point is exceeded a form C relay is de-energized which has a contact rating of 5A/230 V ac with a resistive load.



The set-point is protected against accidental change. A screwdriver must be inserted to adjust the set-point value. The set-point value displayed when switch is depressed.

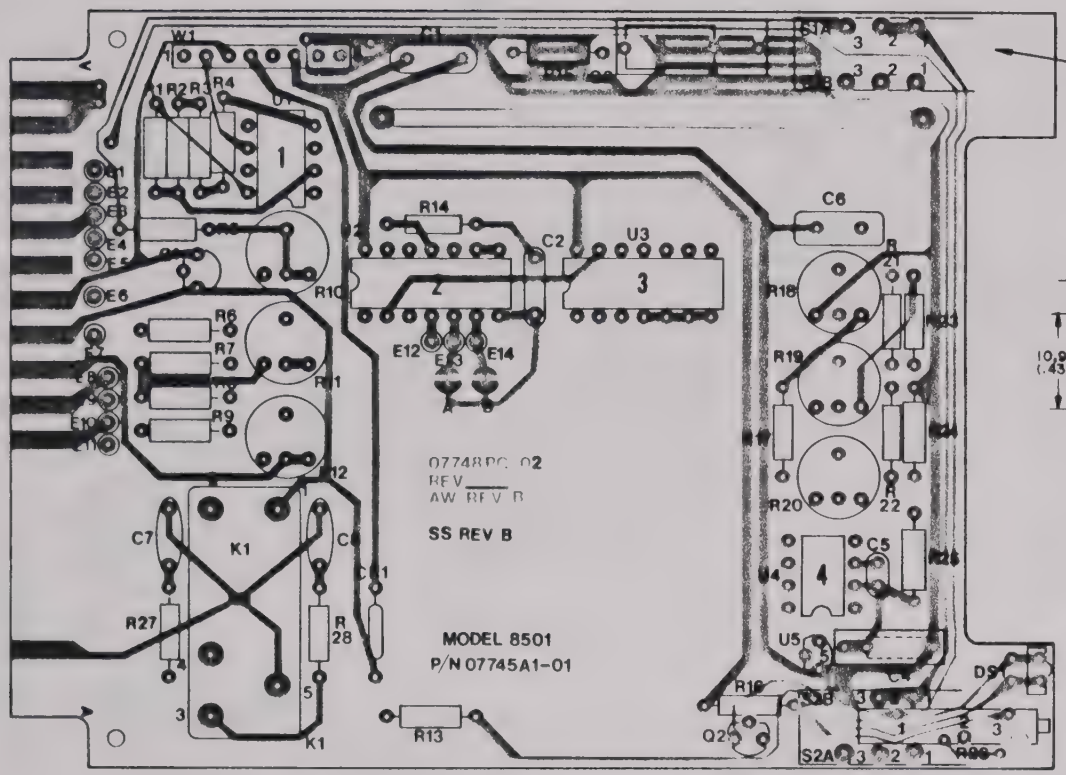
5.2 SPECIFICATIONS

5.2.1 General

Environment	Same as basic meter
Power and Signals	Supplied by basic meter via internal cable.
Connector	
Upper J2	36-pin double row 3.96 mm (0.156 in.) spacing
Set Point Upper Limit Select	Edge connector connections on the OTP card, Blue M may select following upper limits within ±4% tolerance: +425°F (+218°C) +700°F (+371°C) +1400°F (+760°C) °F or °C selectable by latching pushbutton switch behind the lens.
Set Point Adjust	Via a 20-turn potentiometer accessible from the front panel through a hole in the lens.
Set Point Display	By depressing a pushbutton switch which protrudes through the lens in the front panel, the over-temperature set point is displayed by the pyrometer indicator.
Settability	Within 1°
Hysteresis	1-2°C or 2-4°F
Relay Output	
Over Temperature Signal	A form C relay is de-energized when the temperature at the sensor exceeds the set point temperature and a red LED is turned on behind lens.
Contact Rating	5 A, 230 V ac with a resistive load
Contact Isolation	1000 V plus twice maximum rated ac line voltage between contacts and sensor, ac line, or controls.
Contact Circuit Spacing	Spacing of contact circuit leads on the printed circuit board edge connector will comply with UL standards for circuits rated to 250 V ac.

5.3 UPPER CONNECTOR PINOUTS: J2

A	Not Used	1	Relay - N.C.
B	Relay - COM	2	Not Used
C	Not Used	3	Relay - N.O.
D	Not Used	4	Not Used
E	Not Used	5	Not Used
F	Not Used	6	Not Used
H	Not Used	7	+8 V (Full Wave)
J	Spare	8	Spare
K	Spare	9	Spare
L	425°F/218°C	10	700°F/371°C
M	Over Temp	11	Spare
N	Relay GND	12	Spare
P	Not Used	13	Spare
R	Not Used	14	Spare
S	Not Used	15	Spare
T	Not Used	16	Spare
U	DIG GND	17	$\overline{\text{RESET}}$
V	DIG GND	18	+5 V



CHG	E.O. NO	DATES	BY	CHK
C	3753	9-7-89	S K	

2 REVISE & REDRAW AT REV. C 1

4 DO NOT CLEAN IN SOLVENT TANK : K1 & S1, S2.
3. FOR SCHEMATIC SEE 07747SC-01.
2. FOR PARTS LIST SEE 07745A1-01.
1. ASSEMBLE PER WORKMANSHIP MANUAL 02281-01.
NOTES : UNLESS OTHERWISE SPECIFIED

UNLESS SPECIFIED DIM TOLERANCES ARE
WK LIMETERS
X ± .8
XX ± .25
INCHES
XX ± .03
XXX ± .010
ANGLES
± 0° 30'
DO NOT SCALE PRINT

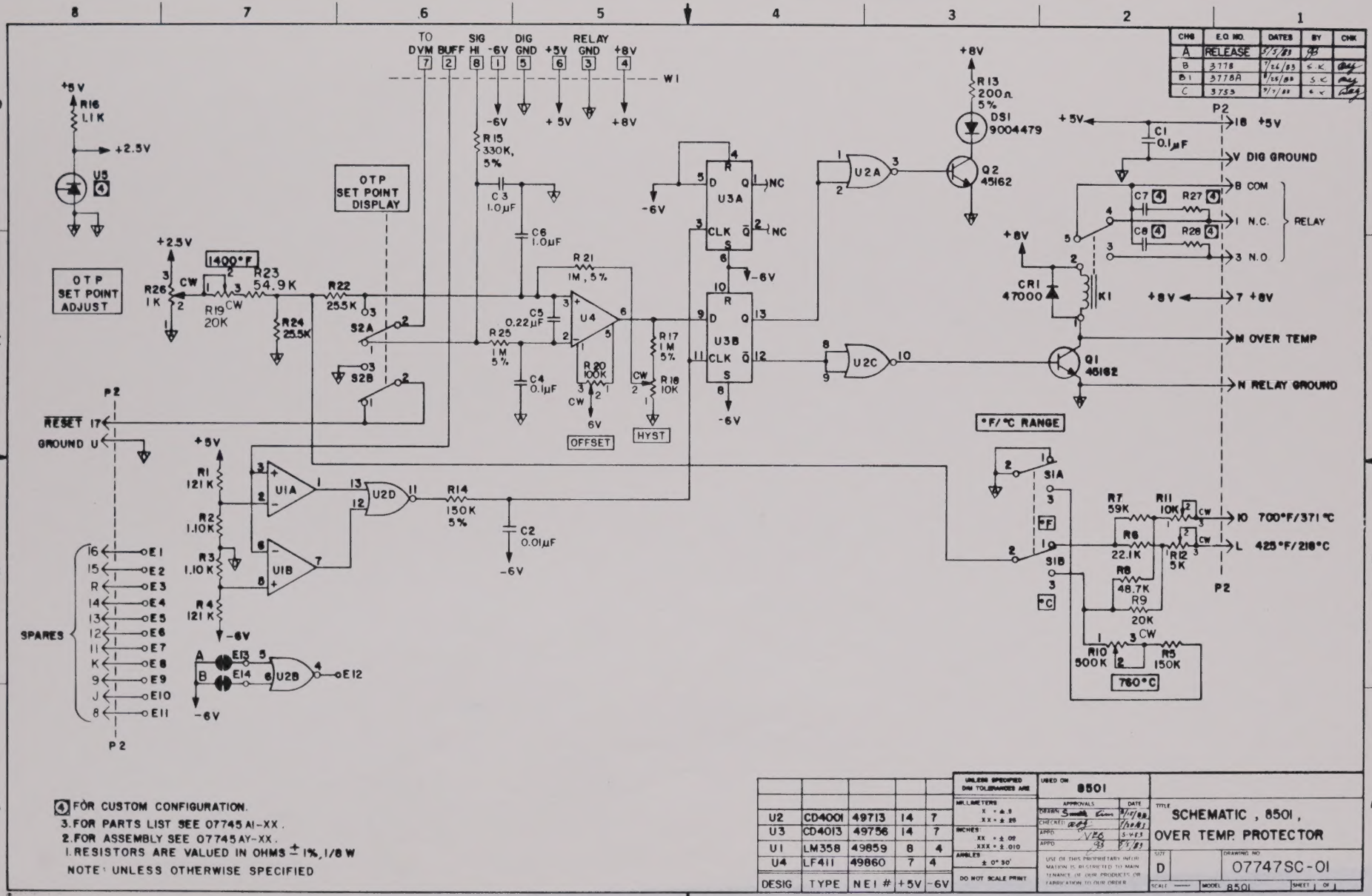
USED ON
8501

APPROVALS		DATE
DRAWN	Scott Kim	9/7/89
CHECKED		9/8/89
ENG	MB	9/27/89
APPD	JB	10/1/89

USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO MAINTENANCE OF OUR PRODUCTS OR FABRICATION TO THEIR ORDER

TITLE
PCBAD, 8501,
OVER TEMP. PROTECTOR

SIZE D
DRAWING NO
07745AY-01
SCALE 4:1 MODEL 8501 SHEET 1 OF 1



CHG	E.O. NO.	DATES	BY	CHK
A	RELEASE	3/5/83	[illegible]	
B	3778	7/26/83	S.K.	[illegible]
B1	3778A	8/26/83	S.K.	[illegible]
C	3753	9/7/83	S.K.	[illegible]

U2	CD4001	49713	14	7
U3	CD4013	49756	14	7
U1	LM358	49859	8	4
U4	LF411	49860	7	4
DESIG	TYPE	NEI #	+5V	-6V

UNLESS SPECIFIED DIM TOLERANCES ARE
MILLIMETERS X ± .5, XX ± .25
INCHES XX ± .02, XXX ± .010
ANGLES ± 0° 30'
DO NOT SCALE PRINT

USED ON 8501

APPROVALS DATE
DRAWN Smith Evans 8/7/83
CHECKED [illegible] [illegible]
APPD VEC 8-9-83
APPD [illegible] 8/8/83

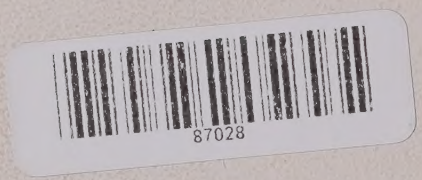
USE OF THIS PROPRIETARY INFORMATION IS RESTRICTED TO MAINTENANCE OF OUR PRODUCTS OR FABRICATION TO OUR ORDER

TITLE SCHEMATIC, 8501, OVER TEMP. PROTECTOR

SIZE D DRAWING NO 07747SC-01

SCALE — MODEL 8501 SHEET 1 OF 1

4 FOR CUSTOM CONFIGURATION.
3. FOR PARTS LIST SEE 07745AI-XX.
2. FOR ASSEMBLY SEE 07745AY-XX.
1. RESISTORS ARE VALUED IN OHMS ± 1%, 1/8 W
NOTE: UNLESS OTHERWISE SPECIFIED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